

11 Immunity – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
white blood cells	白细胞	_____	_____	_____
antibodies	抗体	_____	_____	_____
immune system	免疫系统	_____	_____	_____
pathogens	病原体	_____	_____	_____
phagocytes	吞噬细胞	_____	_____	_____
phagocytosis	吞噬作用	_____	_____	_____
enzymes	酶	_____	_____	_____
antigen	抗原	_____	_____	_____
self antigens	自身抗原	_____	_____	_____
non-self antigens	非自身抗原	_____	_____	_____
antibody	抗体	_____	_____	_____
plasma cells	浆细胞	_____	_____	_____
antigen-binding sites	抗原结合位点	_____	_____	_____

Recall

At IGCSE you learned that **white blood cells** 白细胞 defend the body against germs. Now we look at how they do it.

- Some white cells eat germs; others make **antibodies** 抗体.
- The body can tell its own cells apart from invaders.

Nothing here is harder than IGCSE —it just adds the right words.

New ideas

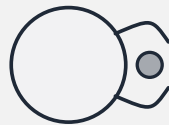
Read these first, then do the Practice.

■ 1 Phagocytes

The **immune system** 免疫系统 is the set of cells that defend the body against **pathogens** 病原体. The first to act are **phagocytes** 吞噬细胞 (a type of white blood cell).

A phagocyte destroys a pathogen by **phagocytosis** 吞噬作用:

1. it **engulfs** the pathogen (surrounds and takes it inside a vesicle).
2. it **digests** the pathogen with **enzymes** 酶.
3. it then **displays** the pathogen's antigen on its surface, to alert other cells.



engulf



digest



display antigen

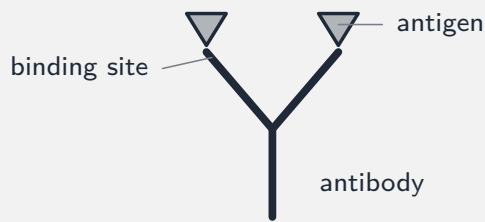
■ 2 Antigens: self and non-self

An **antigen** 抗原 is a molecule (usually a protein) on a cell surface that the immune system can recognise:

- **self antigens** 自身抗原 are the body's own markers —the immune system ignores them.
- **non-self antigens** 非自身抗原 are foreign (e.g. on a pathogen) —they trigger a response.

■ 3 Antibodies

An **antibody** 抗体 is a **Y-shaped** protein made by **plasma cells** 浆细胞. The two tips of the Y are **antigen-binding sites** 抗原结合位点. Each tip has a special shape that fits **one antigen only**, like a lock and key.



Antibodies stick to antigens, clump pathogens together, and mark them so phagocytes find them.

Watch out: an *antigen* is the marker on a cell surface; an *antibody* is the Y-shaped protein that binds it. Each antibody's binding site fits *one* antigen only (a complementary shape). Self antigens are ignored; non-self ones trigger a response.

Practice

Try these in order.

11.1 Name the process by which a phagocyte engulfs and digests a pathogen. [1]

11.2 Put these phagocytosis steps in order: digest, display antigen, engulf. [1]

11.3 What is an antigen? [1]

11.4 Explain the difference between a *self* and a *non-self* antigen. [2]

11.5 Describe the shape of an antibody and name the part that binds the antigen. [2]

11.6 Each antibody binds only one type of antigen. Explain why. [1]

11.7 Challenge. A transplanted organ can be "rejected" by the patient's immune system. Suggest why, using the idea of self and non-self antigens. [2]